

Title (en)

PCR elbow determination by use of a double sigmoid function curve fit with the Levenberg-Marquardt algorithm and normalization

Title (de)

Bestimmung des Wendepunkts eines PCR-Graphen durch Anpassung einer doppelten sigmoiden Funktionskurve mittels Levenberg-Marquardt-Algorithmus und Normalisierung

Title (fr)

Détermination du point d'inflexion d'un graphe PCR par ajustement d'une double fonction sigmoïde via l'algorithme de Levenberg-Marquardt et normalisation

Publication

EP 1801706 A3 20170809 (EN)

Application

EP 06026118 A 20061216

Priority

- US 31631505 A 20051220
- US 34955006 A 20060206

Abstract (en)

[origin: EP1801706A2] Systems and methods for determining characteristic transition values such as elbow values in sigmoid or growth-type curves, such as the cycle threshold (Ct) value in PCR amplification curves. A double sigmoid function with parameters determined by a Levenberg-Marquardt (LM) regression process is used to find an approximation to a curve that fits a PCR dataset. Once the parameters have been determined, the curve can be normalized using one or more of the determined parameters. Normalization is advantageous for determining the Ct value if one chooses the arbitrary fluorescence level (AFL) approach to calculating Ct values for amplification curves. After normalization, the normalized curve is processed by applying a root-finding algorithm to determine the root of the function representing the normalized curve, which root corresponds to the Ct value. The Ct value is then returned and may be displayed or otherwise used for further processing.

IPC 8 full level

G06F 17/10 (2006.01); **C12Q 1/68** (2006.01); **G06K 9/00** (2006.01)

CPC (source: EP US)

G06F 17/10 (2013.01 - EP US); **G06F 17/17** (2013.01 - EP US); **C12Q 1/6851** (2013.01 - EP US); **G06F 2218/02** (2023.01 - US); **G06F 2218/10** (2023.01 - EP US)

Citation (search report)

- [E] EP 1804172 A2 20070704 - ROCHE DIAGNOSTICS GMBH [DE], et al
- [E] EP 1770172 A2 20070404 - ROCHE DIAGNOSTICS GMBH [DE], et al
- [E] EP 1798650 A1 20070620 - ROCHE DIAGNOSTICS GMBH [DE], et al
- [AP] EP 1647910 A1 20060419 - ROCHE DIAGNOSTICS GMBH [DE], et al
- [I] US 2003148302 A1 20030807 - WOO DAVID [CA], et al
- [A] SHENG ZHAO ET AL: "Comprehensive algorithm for quantitative real-time polymerase chain reaction", JOURNAL OF COMPUTATIONAL BIOLOGY, vol. 12, no. 8, October 2005 (2005-10-01), pages 1047 - 1064, XP002380886, ISSN: 1066-5277, DOI: 10.1089/CMB.2005.12.1047
- [A] TICHOPAD A ET AL: "Improving quantitative real-time RT-PCR reproducibility by boosting primer-linked amplification efficiency", BIOTECHNOLOGY LETTERS, vol. 24, no. 24, December 2002 (2002-12-01), pages 2053 - 2056, XP002309015, ISSN: 0141-5492
- [AP] REBRIKOV D V ET AL: "Real-time PCR: A review of approaches to data analysis", APPLIED BIOCHEMISTRY AND MICROBIOLOGY, vol. 42, no. 5, September 2006 (2006-09-01), pages 455 - 463, XP019389693, ISSN: 1608-3024, DOI: 10.1134/S0003683806050024

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US10176293B2; US11615863B2

Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

Designated extension state (EPC)

AL BA HR MK RS

DOCDB simple family (publication)

EP 1801706 A2 20070627; **EP 1801706 A3 20170809**; **EP 1801706 B1 20200115**; CA 2571446 A1 20070620; HK 1105689 A1 20080222; JP 2007193783 A 20070802; JP 4718432 B2 20110706; US 2007143385 A1 20070621; US 7680868 B2 20100316

DOCDB simple family (application)

EP 06026118 A 20061216; CA 2571446 A 20061218; HK 07110781 A 20071004; JP 2006341774 A 20061219; US 34955006 A 20060206